Fascinating Social Displays and Social Structure of Mallard Ducks (Anas platyrhynchos)

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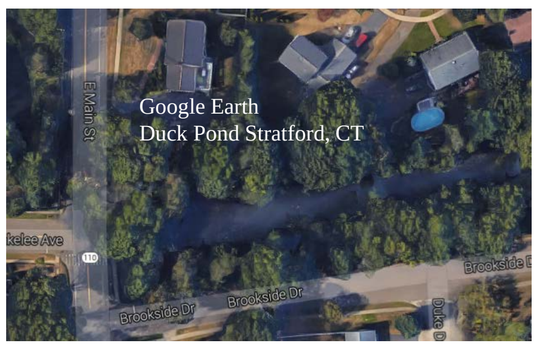
INTRODUCTION

The mallard duck is found throughout North America and Eurasia. Its behavior and social structure in the wild have been influenced by ongoing domestication[1]. All domestic ducks are descended from and interbreed with mallards. Therefore there is constant gene flow between domesticated and wild mallards. We visited Beardsley Zoo with our animal behavior class in late February and noticed that the "farm yard" pond was filled with wild mallard ducks. Furthermore, the swimming ducks maintained a constant inter-individual distance that was enforced through aggression (chasing and biting). We returned to the zoo three more times and each time noted mallard "interpersonal space." We decided to quantify the constancy by taking photographs of the pond every 5 minutes over a one hour period. Two of these photographs spaced 10 minutes apart are below:

We then decided to visit another pond noted for ducks. The duck pond off Main Street in Stratford. Again we observed the same inter-individual distance that we observed at the zoo.



Study Objective

The purpose of this study was to investigate the social behavior of the mallard duck in two different settings in order to determine the function of inter-individual distance for this species. We also endeavored to assess whether the social behavior observed was due to over crowding. There are several large bodies of water 0.5 kM from both the Beardsley Zoo Pond and the Stratford Duck Pond. We assessed crowding at these other locations.

METHODS

We observed mallard social interactions for 45 minutes at two different settings between 11 and 1 on three separate occasions. We created and discussed our own ethogram which we then compared to that created by Ethologist Konrad Lorenz (Figure 1).

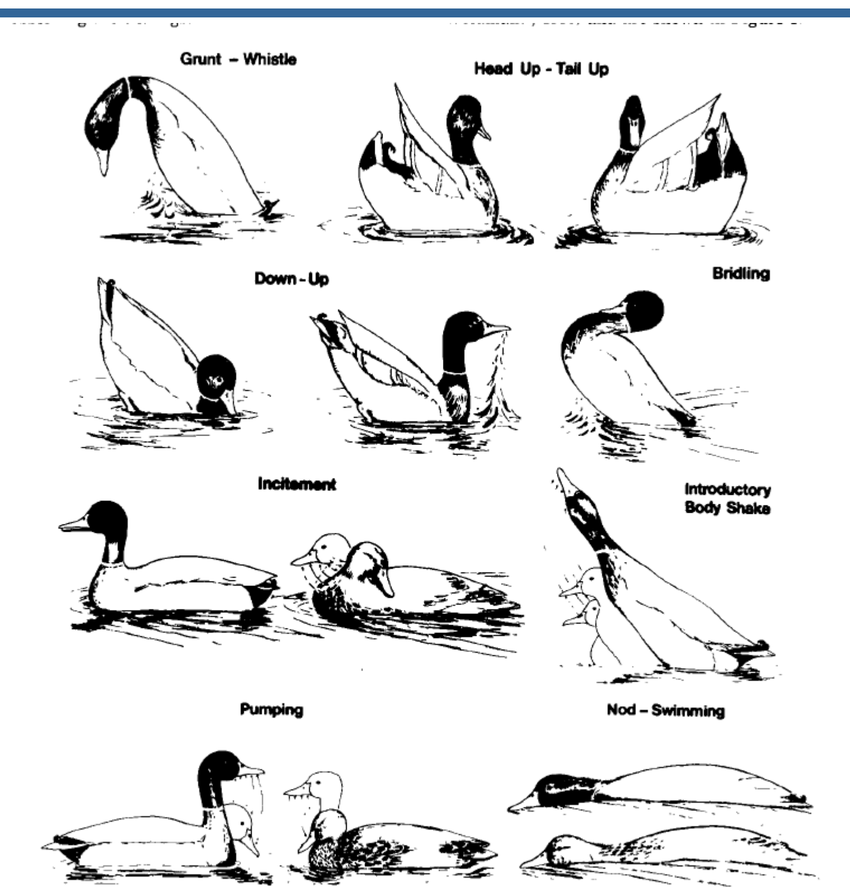


Figure 1. Eight mallard social displays under observation in the present study (adapted from Lorenz, 1941/1971).

Results

Mallard Duck Social Ethogram

Grunt- Whistle	Upright with head bowed
Head Up- Tail Up	Faces another male with head and tail raised
Down-Up	Looks like drinking behavior occurs in the context of social engagement
Bridling	Raises front body out of water
Incitement	Nods head back and forth
Introductory Body Shake	Performed upon entering water
Pumping	Nods head back and forth bill in water
Nod-Swimming	Done while chasing another, head down in water
Bite	Biting at or biting
Forced Copulation	Male forces female

Mallard Duck Non-Social Ethogram

Swim	Swimming
Walk	Movement while on land
Flight	Flying
Foraging	Head Dipping

Comparison of Mallard Behaviors in two Locations

Behavior	Beardsley Zoo 29M, 24 F	Stratford Pond 26 M, 16 F
Tail Wag	6	22
Nod-Swim	17M/M, 4M/F, 1 F/M	11 M/M
Bite	8 M/M	11 M/M, 2 M/F, 2 F/M
Pumping	3	2
Forced Copulation	0	2M/1F

Table 1. Average number of behaviors and birds seen for three 45 minute observation periods.

RESULTS CONTINUED

Narrative

We observed an excess of males in both locations. Males seemed to pair up and attack other males and females. Females selected a single male to be close to and avoided other males. At the pond we observed forced copulation when two males chased a female 120 ft and copulated with her. In both locations the minimum inter-individual distance we observed was the biting reach of the duck. If another individual got within that zone it was attacked. Females avoided crossing that space and so female to female biting was not observed. Females did, however bite males and attempted to flee if a non-preferred male came to close.

We investigated alternative habitats within .5kM of the two ponds. There were groups of 8-10 mallards at these locations. However they were always paired and the sex ratio was equal. The mallards clearly preferred the ponds due to human provisioning, even if they were overcrowded.

DISCUSSION

We began this study because we were interested in inter-individual distance. This study represents a preliminary investigation of that phenomenon in mallard ducks. We made detailed qualitative and some quantitative observations of mallard behavior in an attempt to form hypotheses about inter-individual distance. Our working hypothesis is that the observed inter-individual distance is a function of both over crowding due to human provisioning and aggression on the part of males. The animals attempt to distribute themselves in a manner that reduces aggression. Our brief observations indicated that at least in late winter and early spring, aggression is common.

The choice of these two habitats appears to be somewhat maladaptive for the mallards since they do not have nesting sites at either location. We did not see any individual leave the ponds during our observation periods.

Phenotypic plasticity is a term that indicates when species contain individuals with diverse patterns of behavior. We hypothesize that phenotypic plasticity is present in mallards as some individuals are adapted for large multi-male multi-female groups while other individuals prefer to live in pairs. Further study is required to confirm this hypothesis. These behavioral phenotypes may be the result of domestication such that some individuals prefer human provisioning more than others. Males are found in excess in the provisioned ponds.

The observation of "rape" or sexual coercion was a surprising finding. This behavior has previously been documented in mallards[2]. Sexual Coercion is a manifestation of sexual conflict that occurs when the reproductive interests of males and females differ[3]. Female mallards are reported to have evolved a counterstrategy of reducing egg size for offspring conceived through force[4-5].

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